

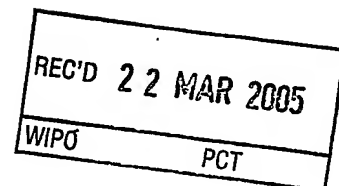


INTELLECTUAL  
PROPERTY INDIA  
PATENTS / DESIGNS / TRADE MARKS /  
GEOGRAPHICAL INDICATION



सत्यमेव जयते

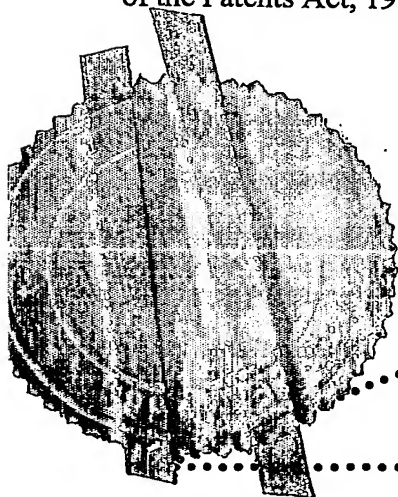
Government Of India  
Patent Office  
Todi Estates, 3<sup>rd</sup> Floor,  
Lower Parel (West)  
Mumbai - 400 013



### THE PATENTS ACT, 1970

IT IS HEREBY CERTIFIED THAT , the annex is a true copy of Application and Provisional Specification filed on 21/10/2003 in respect of Patent Application No.1117/MUM/2003 of The Arvind Mills Ltd., a company incorporated under the Companies Act, 1956, Naroda Road, Ahmedabad - 380 025, Gujarat, India.

This certificate is issued under the powers vested in me under Section 147 (1) of the Patents Act, 1970.



### **PRIORITY DOCUMENT**

SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH RULE 17.1(a) OR (b)

Dated this 29<sup>th</sup> day of October 2004.

(R. BHATTACHARYA)

ASST. CONTROLLER OF PATENTS & DESIGNS.

**FORM 1**

**THE PATENTS ACT, 1970**  
**(39 of 1970)**

**APPLICATION FOR GRANT OF PATENT**  
**[See sections 7 and 135]**

We, The Arvind Mills Ltd., a company incorporated under the Companies Act, 1956, whose address is Naroda Road, Ahmedabad – 380 025, Gujarat, India, do hereby declare :-

- (a). that we are in possession of an invention titled "A METHOD AND DEVICE FOR DYEING COTTON FIBRE"
- (b). that the Provisional Specification relating to this invention is filed with this application.
- (c). that there is no lawful ground of objection to the grant of a patent to us.

We further declare that the Inventor for the said invention is Dr. Kishor Gajanan Agnihotri an Indian National of "PRERANA", Prerana Park, Near L.G. Hospital, Maninagar, Ahmedabad 380 008, Gujarat, India.

That we are the assignee of the true and first inventor.

That our address for service in India is as follows :

Krishna & Saurastri,  
74/F, Venus, Worli Sea Face,  
Mumbai – 400 018, India.

Following declaration was given by the Inventor or Applicant in the convention country :-

I am the true and first inventor for this invention or the Applicant in the convention country declare that the Applicant herein is my assignee.

- a). Dr. Kishor Gajanan Agnihotri an Indian National of "PRERANA", Prerana Park, Near L.G. Hospital, Maninagar, Ahmedabad 380 008, Gujarat, India.



**(DR. KISHOR GAJANAN AGNIHOTRI)**

P.T.O.

That to the best of our knowledge, information and belief the fact and matters stated herein are correct and that there is no lawful ground of objection to the grant of patent to us on this application.

Following are the attachment with the application :


- (a). Form 1 (duplicate)
- (b). Form 3 ( - do - )
- (c). Form 5 ( - do - )
- (d). Provisional Specification (triplicate)

We request that a patent may be granted to us for the said invention.

Dated this 21<sup>st</sup> day of October, 2003.

FOR THE ARVIND MILLS LTD.

Signature :  
Name :  
Designation :

  
C. K. Magwick  
Chief Manager Legal & S.O.

To,  
The Controller of Patents  
The Patent Office  
Mumbai.

Authorised Officer,  
The Arvind Mills Ltd

**THE PATENTS ACT, 1970**  
(39 of 1970)

**PROVISIONAL SPECIFICATION**  
[See section 10]

A METHOD AND DEVICE FOR DYEING  
COTTON FIBRE;

THE ARVIND MILLS LIMITED A  
COMPANY INCORPORATED UNDER  
THE COMPANIES ACT, 1956, WHOSE  
ADDRESS IS NARODA ROAD,  
AHMEDABAD - 380 025, GUJARAT,  
INDIA;

THE FOLLOWING SPECIFICATION  
DESCRIBES THE NATURE OF THIS  
INVENTION.

TITLE:

A METHOD AND DEVICE FOR DYEING COTTON FIBRE

FIELD OF INVENTION:

The present invention relates to the field of dyeing cotton fibre. Particularly, the present invention relates to a method and device for dyeing raw cotton fibre using various dyes especially Indigo dye.

BACKGROUND OF THE INVENTION:

Conventionally, indigo dyeing is carried out at yarn stage either by slasher, rope or hank processing method. Such method of dyeing yarn especially using indigo dye has certain inherent limitations as described herein:

Generally, due to low absorbing capacity of yarn, dyeing at yarn stage results in dyeing of the yarn only at the surface, without sufficient or adequate penetration of the dye into core of the yarn. Another limitation of such method is its inability to dye relatively finer counts. Furthermore, the above method does not permit dyeing of lesser number of yarn threads/ropes due to reasons such as configuration and suitability of the dyeing machine.

In an attempt to overcome the drawbacks of dyeing at yarn stage, methods have been developed to replace conventional dyeing after spinning into dyeing before spinning.

One such method of dyeing before spinning is disclosed in US Patent No 3,660,014 by Kabushiki Kaisha Yamadakuma Senkojo, Japan. The US patent No 3,660,014 discloses a method of continuously treating or dyeing cotton and other fibres and apparatus therefor, comprising a mechanism whereby cotton and other fibre are saturated uniformly with dye liquor or treating liquor and are fed to a fibre receiving pipe having a steeply sloped inner surface. A pressing mechanism presses cotton and other fibre into the cotton receiving pipe intermittently in the state of layers. A cylindrical steam heater is provided below the fibre receiving pipe. A mechanism imparts a sealing force to the lower end of said steam heater and a horizontal steam heater for secondary steam heating.

However, the method of dyeing cotton at fibre stage as disclosed in US Patent No 3,660,014 is particularly suitable for batch production and the above process is not readily suitable for indigo dyeing.

Due to growing demand particularly for indigo dyed textile fabric, continuous dyeing has always been favoured by the industry, and is also commercially feasible.

Eventhough continuous dyeing methods are available for indigo dyeing at yarn stage, due to the drawbacks associated with such method as described in the foregoing description, there axists a need to develop methods for continuous dyeing of cotton at fibre stage.

Our, inventors have proposed a method and device for dyeing cotton continuously at fibre stage particularly using indigo dye, which would overcome the drawbacks and find solution to the problems associated with the prior art dyeing methods and apparatuses especially for indigo dyeing.

#### OBJECTS OF THE INVENTION:

An object of the present invention is to provide a method and device for dyeing cotton at fibre stage wherein the dyeing is done continuously to suit mass production.

An object of the present invention is to provide a method and device for dyeing cotton at fibre stage wherein the dyeing enables obtaining uniform combination of a plurality of colors in the fabric.

Another object of the present invention is to provide a method and device for dyeing cotton at fibre stage wherein the dyeing enables obtaining different colors on either side of the fabric by using different colors for warp and weft yarns.

Yet another object of the present invention to provide a method and device for dyeing cotton at fibre stage wherein the dyeing enables blending of synthetic fibres such as polyester fibres imparted with anti bacterial and fluorescent properties with cotton fibres thereby resulting in imparting special properties to the fabric.

### DESCRIPTION OF INVENTION:

The present invention discloses a method and a device for dyeing cotton at fibre stage.

The dye used may be a vat dye, sulfur dye, reactive dye, direct dye or any other dye suitable for use with cotton and / or cellulosics. Particularly, this method and device is suitable for use with indigo dye.

A method of dyeing cotton at fibre stage according to the present invention comprises carrying cotton fibres either in loose form, sliver form or intermediate form using a support mechanism for immersion into dye baths of a conventional rope / slasher dyeing machine. The fibers along with the support mechanism are subjected to multiple dipping in dye baths preferably indigo dye baths for dyeing. The fibers are then dried and thereafter spun into a yarn for knitting or weaving.

A device for dyeing cotton at fibre stage according to present invention comprises a support mechanism for carrying cotton fibres either in loose form, sliver form or intermediate form for immersion into dye baths of conventional rope / slasher dyeing machine. The support mechanism, along with the fibers is adapted for dipping into a plurality of indigo dye baths for dyeing. The dyed fibers are dried and thereafter spun into a yarn for knitting or weaving a fabric.



Preferably, the support mechanism comprises of a means such as a belt, which is capable of entrapping the fibre for transportation and dipping in dye bath. The dyed fibres from the dye bath are subjected to drying and spinning.

Alternatively, the support mechanism may comprise a substantially porous tubular network suitable for carrying the cotton fibres for facilitating dipping into the dye baths.

Alternatively, the support mechanism may comprise a bucket conveyor wherein the buckets have pores for allowing entry of dye into the bucket and are adapted to carry a predetermined volume of cotton fibre for dyeing.

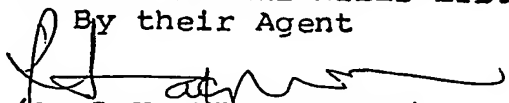
In this application, the scope of the term "support mechanism" is not only limited to the embodiments referred to therein the foregoing description but also includes various means and forms of carrier devices that may be provided for carrying fibre in the form of sliver, loose or intermediate forms for dyeing by dipping into the dye baths in a continuous fashion.

Such method of carrying fibre using a support mechanism enables continuous dyeing and hence mass production.

The other advantages of the invention are apparent from the foregoing description.

Dated this 21st day of October, 2003.

FOR THE ARVIND MILLS LTD.  
By their Agent

  
(R. LAKSHMINARAYANAN)  
KRISHNA & SAURASTRI